

**Studies on the Qualities of Sole Leathers
from Slaughtered and Fallen Buffalo Hides**

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STUDIES ON THE QUALITIES OF SOLE LEATHERS FROM SLAUGHTERED AND FALLEN BUFFALO HIDES

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Sole leather making properties of 25 slaughtered and 25 fallen hides collected from Western India have been investigated. Leathers from slaughtered hides are adversely affected due to flay cuts and those from fallen hides are degraded in quality due to the presence of blood marks and stains in finished leathers. Difference in leather yield on pelt weight between leathers from slaughtered and fallen hides is only one per cent. Physical properties of the leathers made from slaughtered and fallen hides do not differ to any considerable extent.

India is a country with a large live-stock population. The production of hides in India is also considerably high but the hides are not of good quality for several reasons. One such reason is the restriction on cattle slaughter. About 86.7 per cent of the Indian cattle hides and 87.2 per cent of buffalo hides¹ are obtained from dead animals and are termed as 'fallen hides.' It is generally considered that the quality of fallen hides is inferior to that of slaughtered hides. But no systematic study has so far been made comparing the leather making properties of fallen and slaughtered hides for producing different types of leathers. Such an investigation may provide considerable information about the qualities of the fallen hides and may give helpful indications in improving their leather making properties.

Buffalo hides in India are generally used for making sole and industrial

leathers. The present work deals with a comparative study of the slaughtered and fallen buffalo hides in respect of their properties for making vegetable tanned sole leathers.

Materials and methods

25 slaughtered buffalo hides were collected from Bombay slaughter house and 25 fallen hides were collected from the Flaying and Carcass Utilisation Centre (Kora Kendra), Bombay. The hides received in wet salted condition were examined for their qualities by visual inspection.

The hides were shaken off the excess salt and visually examined taking into account various defects like (i) flay cuts e.g., holes, deep and light cuts, (ii) grain damage due to sores, abrasion, scratches and putrefaction, (iii) curing defects e.g., 'hair slip', 'red-heat' etc., (iv) substance and (v) general appearance.

Processing

Both the slaughtered and fallen hides were processed into vegetable tanned sole leather according to a rapid tanning process described below. The hides were taken for tanning in a number of lots using the same number of slaughtered and fallen hides for each batch.

The hides were soaked overnight in a pit containing 500% water and a handful of lime (water should react alkaline to phenolphthalein.) Next day they were taken out, cut into sides, green fleshed to remove excess flesh, horsed up to drain excess water and weighed. They were then limed for one day in a pit containing 3.5% sodium sulphide (fused), 2% caustic soda and water to immerse them completely. The sides were handled thrice that day and left overnight in the same pit. Next day they were unhaired, fleshed and weighed. Pelts were then washed in a paddle for one hour and scudded and left overnight in a pit containing plain water.

They were scudded once again and transferred to a pit containing 10° BK liquor made by dissolving wattle extract. 2% sodium hydrosulphite and 1% formic acid were added to the liquor. The pH of the bath was adjusted to 3.5. The sides were handled in this pit twice, once in the morning and once in the evening. On the 2nd day the pH was adjusted to 3.5 with 0.125% formic acid and the sides were handled as before. On the 3rd day the sides were transferred to a pit containing 50°BK liquor of wattle extract. The pH of the liquor was adjusted to 3.5 with 0.5% formic acid and 1% sodium hydrosulphite. The sides

were handled in this pit for 2 days. the 5th day sides were transferred to pit containing 75° BK liquor of wattle extract. The pH was adjusted to 3.6 with 0.5% formic acid and 1% sodium hydrosulphite. Next day the sides were handled in the same liquor.*

On the 7th day sides were drummed in a liquor of 120° BK (100% flow) pH being adjusted with 0.25% formic acid to 3.6-3.7. The sides were drummed intermittently for the whole day and piled on ground for one day. Sides were washed on the 9th day, bled, loaded and oiled. They were next day and hooked for drying. Crust leathers were removed from hooks, seasoned and rolled.

Leather quality

The quality of the leathers was assessed visually on the basis of the following: (i) general appearance, (ii) colour, (iii) uniformity, (iv) flexibility, (v) pininess, (vi) crackiness and (vii) gloss. Some physical properties e.g., abrasion, water absorption and apparent density characterising the qualities of the leathers were also determined.

Results and discussion

Assessment of raw hide quality is given in Table 1. Tannery weights given are for processing i.e., soaked, limed and

* Addition of sodium hydrosulphite and formic acid to the tan liquors gradually increases with the subsequent lots and after lots have passed through the liquor, the requirement of sodium hydrosulphite and formic acid is only about 1/4 of the quantity used in the fresh liquor.

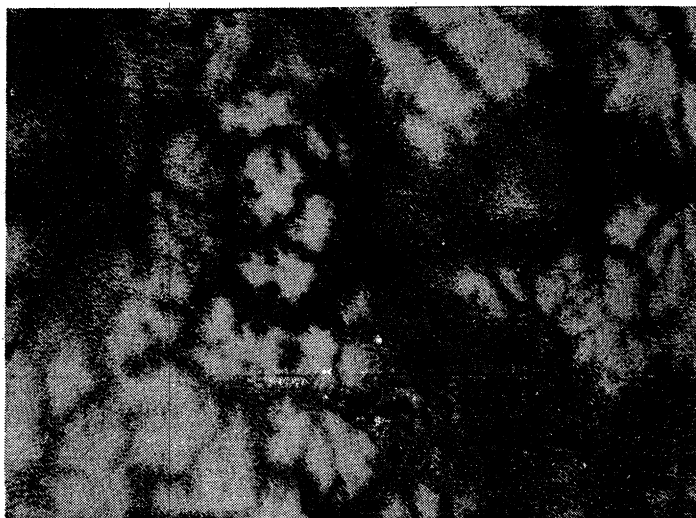


FIG. 1

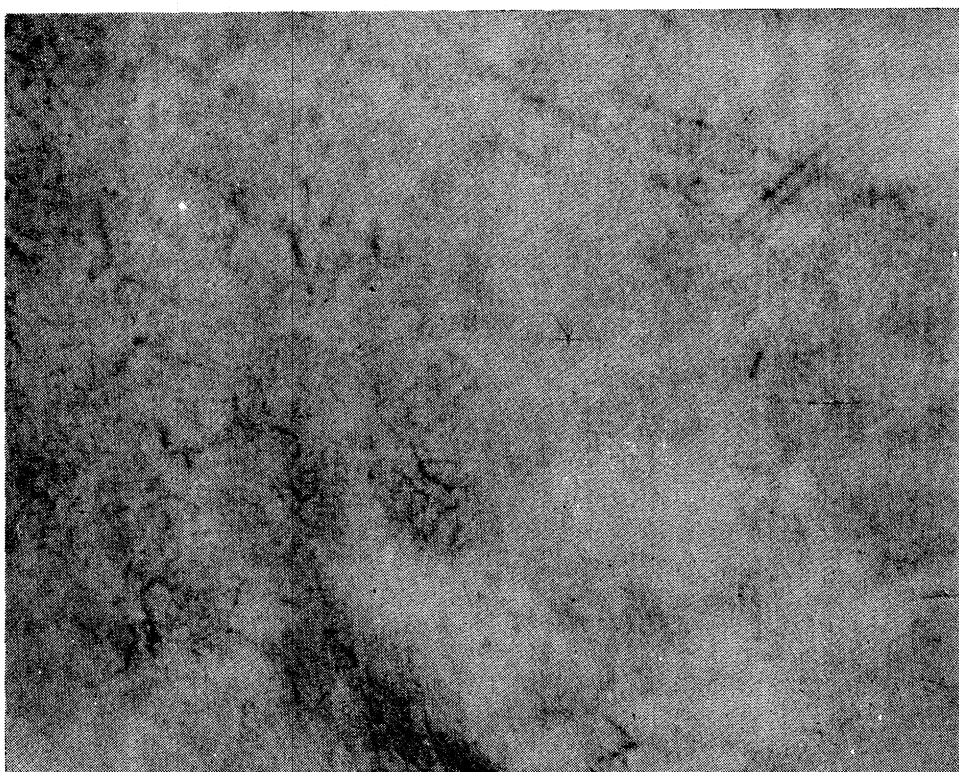


FIG. 2

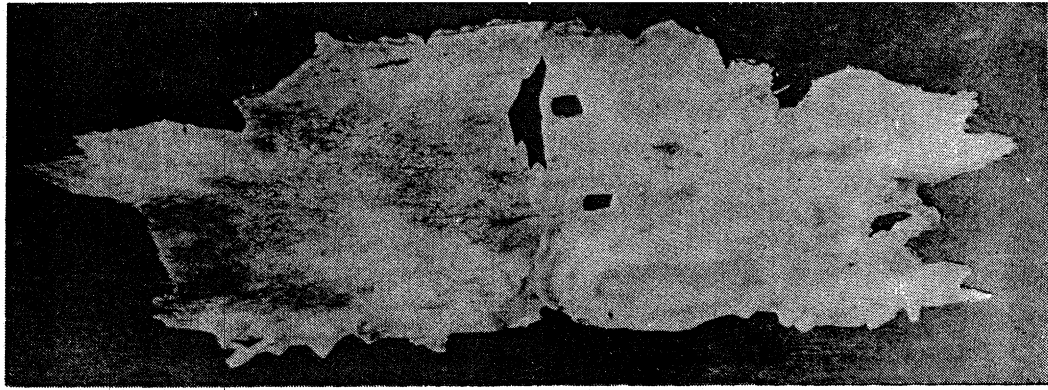


FIG. 3

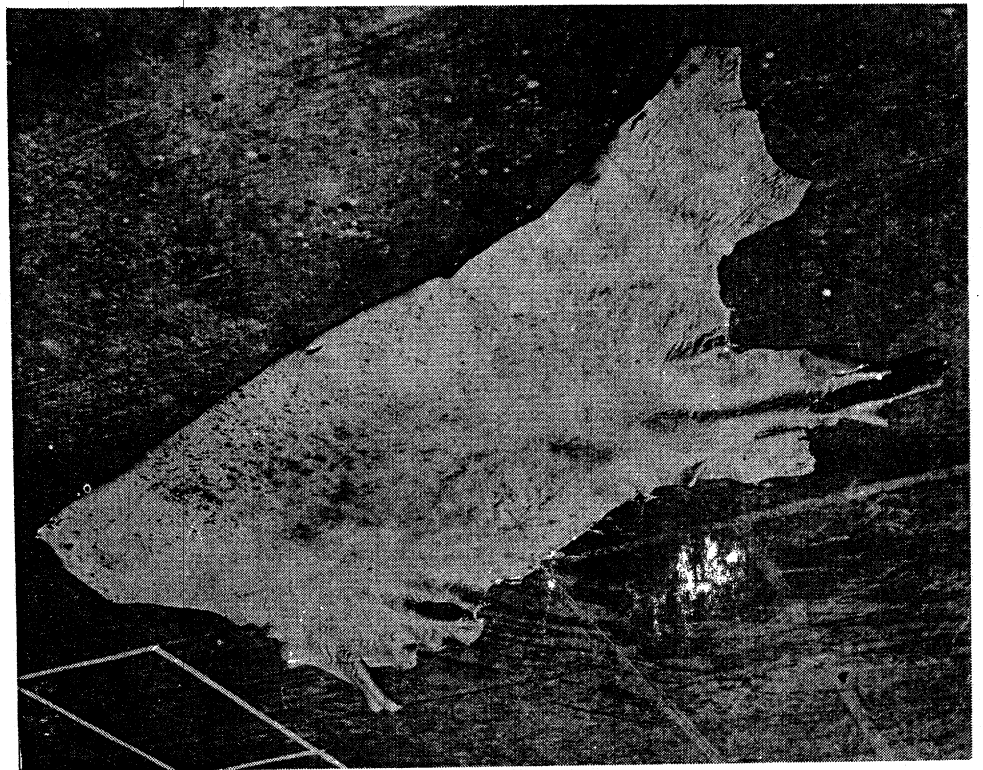


FIG. 4

Table 1
VISUAL ASSESSMENT OF QUALITY OF RAW BUFFALO HIDES

	Slaughtered	Fallen
	Sample Numbers	
Prime	6, 8, 9, 11, 15, 17, 18, 19, 21	14, 23, 25
Seconds	2, 3, 4, 10, 13, 14, 20, 22, 23, 24	5, 6, 8, 10, 12, 16, 19, 22
Thirds	1, 5, 7, 12, 16, 25	1, 2, 3, 4, 7, 9, 11 15, 17, 18, 20, 21, 24
Rejections	Nil	13

General observations

The slaughtered hides are properly cured, well fleshed and free from putrefaction and grain damage. But many of these hides are damaged due to flay cuts which lowered their qualities.

The fallen hides are free from flay cuts but retain a good amount of adhering flesh. One hide, belonging to rejection quality, is found to be degraded due to putrefactive grain damages.

ned weights are given in Table 2. Physical properties of the finished leathers are tabulated in Table 3.

It may be noted from Table 1 that of the 25 slaughtered hides, 9 hides have been graded as prime, 10 as second and 6 as third quality. On the other hand, 3 fallen hides have been graded as prime quality, 8 are seconds, 13 are thirds and 1 of them is of rejection quality. Thus it appears that slaughtered buffalo hides are comparatively better in quality than the fallen buffalo hides.

During the liming operation it was noticed that most of the fallen hides had either blood patches or a network of blood marks due to the presence of congealed blood along the network of veins. Figs. 1 and 2 represent such a network of veins and different patches due to blood and possibly other pigmented materials that could not be removed during

normal pretanning processes. It was observed that such blood patches or blood stains were more prominent on one half of the hide than the other. It is quite expected that in fallen hides one half of the hide may be affected more than the other. This is due to the fact that dead animals are left lying down on the ground for a considerable length of time before they are taken for disposal and as such are subjected to putrefactive and mechanical damages. Fig. 3 clearly shows the contrast between two sides of the same hide after liming. The network of blood marks is apparent on the left hand side. These blood marks and other pigmented scud marks could not be removed even after tanning though they become less prominent. This may be seen in Fig. 4 which depicts an unfinished leather i.e., after pit tanning and before drum tannage. Such patches and marks, if persist, do appreci-

ably devaluate the leather quality although other properties of the leathers remain unaffected. Such patches were found absent in the slaughtered hides.

On an average, slaughtered hides give about 60% and fallen hides about 59% yield on pelt weight. Although a difference of 1% yield may be considered insignificant, this point requires further

Table 2 represents sole leather yield.

Table 2
TANNERY WEIGHTS (IN LB) DURING SOLE LEATHER PROCESSING

Slaughtered					Fallen				
Samp. No.	Raw	Soaked	Pelt	Leath.	Samp. No.	Raw	Soaked	Pelt	Leath.
WS1	45	56	60	28	WF1	65	70	72	49
WS2	58	67	78	42	WF2	64	70	75	47
WS3	70	75	80	47	WF3	51	57	65	38
WS4	42	53	64	39	WF4	59	60	65	47
WS5	64	77	89	57	WF5	48	53	63	34
WS6	70	83	89	54	WF6	61	64	70	35
WS7	47	58	77	42	WF7	72	72	80	51
WS8	61	70	92	56	WF8	58	58	66	39
WS9	68	75	87	53	WF9	70	82	87	52
WS10	55	69	82	50	WF10	65	70	83	48
WS11	50	62	71	42	WF11	46	59	60	39
WS12	48	59	65	44	WF12	74	74	88	51
WS13	50	60	70	36	WF13	73	77	86	53
WS14	55	60	77	42	WF14	64	73	89	56
WS15	59	68	73	48	WF15	74	87	92	58
WS16	65	70	90	58	WF16	46	52	61	35
WS17	56	64	77	48	WF17	48	57	68	30
WS18	68	79	80	50	WF18	65	70	85	49
WS19	68	80	81	51	WF19	42	46	57	38
WS20	68	75	80	50	WF20	65	66	76	48
WS21	70	80	80	46	WF21	56	56	77	38
WS22	70	76	90	58	WF22	56	61	65	37
WS23	61	82	91	58	WF23	70	77	82	47
WS24	70	75	78	44	WF24	70	76	85	48
WS25	50	60	70	39	WF25	68	79	96	50
Total weight	1488	1733	1971	1182		1530	1666	1893	1117
Yield (on pelt weight)				60%					59%

Table 3

PHYSICAL PROPERTIES OF SOLE LEATHERS FROM SLAUGHTERED AND FALLEN HIDES

	Abrasion (inch/ 400 R)	Apparent density	Thick- ness (mm)	% Water absorption		
				½ hr.	2 hrs.	24 hrs.
<i>Slaughtered</i>						
Maximum	0.125	1.030	7.5	34.0	40.00	43.5
Minimum	0.081	0.866	4.4	26.0	31.50	35.0
Average	0.098	0.976	6.0	30.0	35.00	39.0
<i>Fallen</i>						
Maximum	0.132	1.150	7.8	32.5	39.0	44.0
Minimum	0.089	0.952	5.5	20.0	29.5	30.0
Average	0.102	1.020	6.3	28.0	33.0	37.0

verification. It is of interest to note that yield when calculated on raw weight is about 79% in the case of slaughtered hides and only about 72% in the case of fallen hides. This is due to the presence of excess adherent flesh in fallen hides.

Leathers produced from slaughtered hides are graded as follows: 7 primes, 11 seconds, 5 thirds and 2 rejections. 2 pieces are graded as rejections because of deep flay cuts and incidence of grain crackiness in one side. Most of the leathers that are graded as thirds have flay cuts. In the case of leathers from fallen hides 2 are graded as primes, 6 as seconds, 10 as thirds and 7 as rejections. It may, however, be noted that both in slaughtered and fallen hides the selection of finished leathers is rather lowered as related to the raw selection. Deep flay cuts in case of slaughtered hides and blood and other patches in fallen hides are mainly responsible for such devaluation of the leathers.

Data presented in Table 3 show that physical properties e.g., abrasion, water absorption, apparent density and thickness of leathers produced from slaughtered and fallen hides do not differ to any great degree. On an average the abrasion after 400 R and apparent density are slightly more and water absorption is slightly less in case of leathers from fallen hides.

Acknowledgment

This investigation forms part of a programme of research sponsored by the U.S. Department of Agriculture under the authority of Public Law 480. Thanks are due to Dr. R. Bhaskaran for his valuable help in the course of this investigation and to Sri R. Krishnamurthi for taking the photographs.

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